HD1761
G6
No. 160

Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

FACTORS RELATED TO ACTION PRICE PREMIUMS–FRESH THOMPSON SEEDLESS AND TOKAY GRAPES

Ivan M. Lee and H. B. Richardson

CALIFORNIA AGRICULTURAL EXPERIMENT STATION
GIANNINI FOUNDATION OF AGRICULTURAL ECONOMICS

Mimeographed Report No. ~~159~~ 160
January 1954

LIBRARY
UNIVERSITY OF CALIFORNIA
DAVIS

UNIVERSITY OF CALIFORNIA
DAVIS
JAN 21 1954
LIBRARY

TABLE OF CONTENTS

	Page
Introduction	1
Description of Data	2
Method of Analysis	8
Summary of Results	19
Concluding Remarks	43

List of Exhibits

Exhibit		
1	Schedules Used for Recording Observations on Lots of Fresh Grapes Sold on the New York Auction Markets	3
2	Code Designation, Variables Entering Analyses of Factors Related to Price Premiums	12

List of Tables

Table		
1	Regression Coefficients and Supplementary Measures, Thompson Seedless Seasonal Equations, 1951	21
2	Regression Coefficients and Supplementary Measures, Thompson Seedless Daily Equations, 1951	27
3	Net Regression Coefficients Converted to Dollar Units, Selected Seasonal Equations, Thompson Seedless and Tokay	32
4	Regression Coefficients and Supplementary Measures, Thompson Seedless Seasonal Equations, 1952	34
5	Regression Coefficients and Supplementary Measures, Thompson Seedless Daily Equations, 1952	36
6	Regression Coefficients and Supplementary Measures, Tokay Seasonal Equations, 1952	39
7	Regression Coefficients and Supplementary Measures, Tokay Daily Equations, 1952	41

FACTORS RELATED TO AUCTION PRICE PREMIUMS--
FRESH THOMPSON SEEDLESS AND TOKAY GRAPES[1]

Ivan M. Lee[2] and H. B. Richardson[3]

Introduction

Growers of grapes for fresh market exercise a certain amount of control over the physical characteristics of the product marketed through the combination of cultural practices employed. For example, berry size and the configuration of bunches can be controlled to a certain extent by appropriate thinning and pruning practices. Likewise, timing of picking operations entersto influence such characteristics as berry size, color, and Balling-acid ratio. After the grapes leave the vineyard, the packing operation provides further opportunity to improve the physical appearance of a lug of fruit through appropriate sorting, trimming, and handling in the packing process. Such characteristics as firmness of pack, uniformity in color and size, and the elimination of detracting bunch features can be introduced at this stage of the production process. This report offers some tentative quantitative measures of the relations between selected qualitative characteristics and price premiums for fresh Thompson and Tokay grapes in the New York auction market during the 1951 and 1952 seasons.

The information which forms the basis for the analyses summarized in this report was, to a significant extent, a by-product of a program initiated by the Extension Service in response to requests by growers. An essential feature of the Extension program involved the careful inspection, supplemented by photos, of selected lots of fresh grapes in order to carry back to the growers a picture of the fruit and pack characteristics which were, in the opinion of the observer, detracting from the salability of the fruit in this market. In the process of

---

[1] The research on which this report is based represents a joint undertaking of the Giannini Foundation and the California Agricultural Extension Service. The junior author was the observer responsible for the collection of data in the New York auction market. The senior author was responsible for the analysis of the data and the preparation of this report.

[2] Assistant Professor of Agricultural Economics and Assistant Agricultural Economist in the Experiment Station and on the Giannini Foundation, Berkeley, California.

[3] Extension Specialist in Viticulture, Davis, California.

selecting the particular lots exhibiting the characteristics desired for illustrative purposes, most of the lots displayed on the auction floor were observed. In this observation, the information here analyzed was recorded.

Resources limited the study to a single auction market. This being the case, the choice of the New York auction market seems an appropriate one. Of the total interstate rail passings of Thompson Seedless grapes for fresh consumption in 1951 and 1952, between one fifth and one fourth moved to New York City in each year. Of the total moving to New York City, around 60 per cent was sold on the auction market in each year. As an outlet for fresh Thompson Seedless grapes, New York City is surpassed only by Chicago. An additional factor which was given some weight in the selection of New York over Chicago was the longer shipping distance involved. As will be apparent, however, this factor is not of major significance since observations on characteristics uniquely related to shipping distance have not been explicitly recognized in the information recorded. With respect to fresh Tokays, New York City provides a relatively less important outlet, accounting in 1952 for less than 5 per cent of total interstate passings, virtually all of which was sold in the auction market.

Description of Data

Our data were collected on the New York auction floor during the 1951 and 1952 marketing seasons. In 1951, observations were recorded on over 90 per cent of the Thompson Seedless lots sold on this auction during the 8 consecutive weeks beginning July 30. In 1952, information was collected over the 19-week period beginning June 30. The Thompson Seedless market was active during this entire period, while Tokays were on the market in significant volume only during the latter half of this period. During the 1952 season, observations were recorded on very nearly 100 per cent of both Thompson and Tokay lots sold.

An inspection of the original schedules, included as Exhibit I, will reveal the kind of information which was recorded for each lot. During the night and early morning preceding a given sale day, the fruit to be sold was arranged by lots, varying in size in 1951 from 10 to over 1,000 lugs, on the auction floor. About 1 per cent of the lugs in each lot were regularly opened for inspection by prospective buyers before the opening of sales. It was on the basis of an inspection of these opened lugs that each lot was classified with respect to the several qualitative characteristics specified in the body of our schedules, and the observation was recorded by placing a check mark in the appropriate cell. The price of each lot was transcribed from auction records on the

EXHIBIT 1

Schedules Used for Recording Observations on Lots of Fresh Grapes Sold on the New York Auction Markets

A. Market Characteristics of Fresh Thompson Seedless Grapes--1951

Lot No.______ *Sp. No. ______ No. of lugs ______ Price ______

Lug weight______lbs. Sale date ______ ______ month day

Color

green		1
light green		2
amber/yellow		3
straw/yellow green		4

Berry Condition

crisp		1
firm		2
soft		3

Taste (acid-sweetness)

	very sweet		sweet		acid	
high acid		1		2		3
low acid		4		5		6
flat		7		8		9

Pack Condition

firm		1
slack		2
very slack		3
browning		4

Stem Condition

	pliable		fresh		dry	
yellow		1		2		3
green		4		5		6
brown		7		8		9

Presence of:

wetness		1
waterberry		2
wetness & wtrby.		3

Fruit Quality

excellent		1
top good		2
medium good		3
low good		4
poor		5

Pack Treatment

special lug		1
liners		2
sp. lug & lnrs.		3

ornamentation		1
cushions		2
orn. & cush.		3

Decay per cent ____%

Shatter per cent ____%

Berry Size (gram wt. per berry)

2.9 and up		1	
2.6 - 2.8		2	
2.3 - 2.5		3	
2.0 - 2.2		4	
1.7 - 1.9		5	
below 1.7		6	

Refractometer reading______

Acid rating______

Precooled______ Std. Refrig.______ Via Exp.______

Comments:

---

* Indicates special number. This space was provided in case it was needed for identification of a given sublot. It developed that this was not needed for identification and, hence, no entries appeared in this space on the completed schedules.

Exhibit 1 continued.

B. Market Characteristics of Fresh Thompson Seedless Grapes--1952

Lot No. ________ No. of Lugs________ Price ________

Daily Serial No. ________

Sale Date ____ ____
month day

Color

green		1
light green		2
amber/yellow		3
straw green		4
irregular		5

Pack condition

firm		1
slack		2

Fruit quality

excellent		1
top good		2
medium good		3
low good		4
poor		5

Box condition

clean		1
poor		2

Berry size

large		1
medium		2
small		3

Bunch description

	stringy		loose		tight	
large		1		2		3
medium		4		5		6
small		7		8		9

Stenciling and labeling

neat		1
poor		2

Mode of shipment

freight		1
express		2

Refractometer reading________

Acid rating ________

S.A.R. ________

Position in sale ________

Brand name________

Comments:

Exhibit 1 continued.

C. Market Characteristics of Fresh Tokay Grapes--1952

Lot No.________ No. of Lugs________ Price ________

Daily Serial No.________ Sale Date

month	day

Color

purple		1
50%		2
25%		3
pink		4
irregular		5

Pack Condition

firm		1
slack		2

Fruit quality

excellent		1
top good		2
medium good		3
low good		4
poor		5

Box condition

clean		1
poor		2

Berry size

large		1
medium		2
small		3

Bunch description

	stringy		loose		tight	
large		1		2		3
medium		4		5		6
small		7		8		9

Stenciling and labeling

neat		1
poor		2

Mode of shipment

freight		1
express		2

Refractometer reading________

Acid rating ________

S.A.R. ________

Position in sale ________

Brand name ________________

Comments:

day following sale. Except for berry size in the 1951 study and the sugar and acid determinations in both years, the criterion used in classification was judgmental. Color charts were available at the time of observation as a guide in color classification. No such aids were available for the classification with respect to the remaining characteristics. The information contained in the completed schedules with respect to these factors, therefore, depends to a very considerable extent upon the consistency of the observer's judgment over lots and over the season. The berry weights in 1951 Thompson Seedless and the sugar and acid determinations in all cases were based on objective measurements on a sample of 20 berries from the displayed lugs in each lot.[4] No controls were imposed on the manner of selection of the sample of berries aside from the observer's judgment as to what constituted a "representative" sample of berries. The apparent objectivity in measurement, therefore, may be partially offset by the lack of objectivity in selection thus introducing an unknown and perhaps unstable bias in the measurement over lots. Space was provided on the 1951 schedule for the recording duplicate measurements on berry size, sugar, and acid. Duplicate measurements were made on a sample of about 10 per cent of the lots selected systematically in this year. The purpose of this procedure was to obtain some check on the within-lot variability with respect to these measurable factors. No significant differences were apparent in any of the factors. Our procedure can hardly be considered to have yielded information for a conclusive test, however, due to the uncertainties surrounding both the selection of the display lugs in each lot and the sample of berries for measurement from the display lugs. This procedure was dropped in the 1952 study.

The specific attributes of the fruit or pack, on which classification with respect to each of the qualitative characteristics was made, are clear from an inspection of the schedule, with the exception of the fruit quality characteristic. The judgment rating entered at this position on the schedule represents, in part, an over-all rating reflecting a combination of the other individual characteristics indicated on the schedule. In addition, however, such factors

---

[4] Berry weights were recorded in gram weight per berry. Sugar was measured by Balling hydrometer and acid by acid titration. The variable used in our analyses is the Balling-acid ratio. For details on the sugar and acid tests, see H. E. Jacob (Revised by A. J. Winkler), Grape Growing in California. Berkeley, November, 1950. pp. 50-52. (Calif. Agr. Ext. Serv. Circ. 116)

as the within-lug uniformity with respect to the individual characteristics and the general appearance and condition of the fruit as it reaches the auction floor are here reflected. It is clear that the omnibus character of this factor limits materially the information which it supplies for meaningful analysis. Yet, it seemed plausible to proceed on the assumption that the characteristics recorded under fruit quality might well exert an influence on price independent of the individual factors observed separately, although the characteristics responsible for such an influence are not explicitly identified.

Attention is called to the fact that several of the characteristics observed in the 1951 study were either omitted or altered in the 1952 study. In part, these changes were instituted in an attempt to obtain observations on additional pack and fruit characteristics for analysis and, at the same time, keep the length of the schedule within manageable proportions. The time for observation on the auction floor was limited. Furthermore, completion of the schedules, as has been indicated, was only a part of the observer's job. It was the time limitation which motivated the substitution of the judgmental classification with respect to berry size in 1952 for the weight measurements employed in 1951. It is recognized that, from the standpoint of the phase of the study reported here, this shift is probably in the wrong direction. However, it is difficult to assess the loss of information involved in this substitution in the present framework. As noted earlier, the objectivity sought through weight measurement may well be misleading due to the sampling methods employed.

Aside from the observed characteristics of the fruit or pack, certain additional factors have been assembled for inclusion in the analysis. Important among these are mode of shipment (freight versus express) and brand name under which the fruit is sold. These factors, of course, are not unrelated to the pack and fruit characteristics observed. Mode of shipment would be expected to affect the condition of fruit upon arrival in distant eastern markets and, to this extent, is probably partially reflected in the fruit quality and stem condition characteristics. A particular brand name, likewise, probably attains its status in the market through the reputation it acquires largely through the characteristics of the fruit packed under that name. Recognition of these interrelationships, however, does not preclude the possibility that mode of shipment and brand may exert an influence on price not explainable by the characteristics of the fruit or pack observed. It will be observed that mode of shipment information was recorded on the schedule in each year. The brand information was recorded directly on the schedule in 1952. In 1951, the brand information came from

auction slips made available to us and easily identifiable by lot from the identifying information recorded in the heading of the schedule at the time the fruit was inspected.

The absence of information concerning the particular fruit and pack characteristics reflected by the fruit quality, mode of shipment, and brand observations is a notable inadequacy of our data. This will be particularly apparent in the case of the latter two factors which, it develops, are dominant variables in several of the formulations summarized in the next section. Had information been collected on the important separate characteristics reflected by these three factors, a more meaningful interpretation of the results with respect to these factors might have been possible. On the other hand, there may well have remained net effects due to these factors. In this connection, it is remarked that it was not the intent that the schedule should specify all of the separate characteristics in detail. Those selected for observation reflect that orientation of the study toward characteristics which are, in part, controllable through appropriate cultural and, to a lesser extent, packing practices.

Position in sale represents another factor which was recorded on the 1952 schedules. It is the practice on the auction market to rotate position in sale among receivers from day to day through the season. It was observed during the 1951 survey that the first position seemed to be preferred by receivers, suggesting the possibility of an associated price advantage. Information on position in sale was collected in 1952 to investigate the validity of this supposition.

Method of Analysis

In the 1951 Thompson Seedless study, just under 1,400 schedules were taken on lots of grapes marketed during the 8-week period beginning July 30. The 1,400 lots observed represented something over 90 per cent of the lots marketed on the New York auction during this period. In 1952, around 2,800 Thompson Seedless schedules were obtained during the 19 consecutive weeks beginning June 30 and some 300 Tokay schedules during the latter half of this season when Tokay marketings were active. In the latter year, schedules were obtained on almost 100 per cent of both Thompsons and Tokays marketed during the period studied.

The object of the analysis was to obtain some approximate indications of the quantitative effects of the several factors observed on price in the auction market. Conventional multiple regression methods were employed in analyzing

these net effects.[5] However, preliminary analysis was necessary in order to bring the problem within the regression framework. The chief difficulty here is obviously with respect to the nonquantitative character of the observations on most variables. Where a classification with respect to a nonquantitative variable on the schedule contained more than two classes, it was necessary to dichotomize the classification. With more than two classes, the appropriate numerical values to be assigned to the classes are not known. Dichotomization can obviously be accomplished by discarding classes, by combining classes, or by a combination of the two. Preliminary analyses with respect to price and each individual qualitative characteristic served as the basis for the dichotomization adopted in this study. For the characteristics on the schedule containing one criterion of classification and more than two classes, dichotomization was accomplished by combining classes. In cases of two criteria of classification, dichotomization was accomplished by suppressing one criterion. For example, in the case of color on the 1951 schedule, "green" and "light green" were combined forming one class, with "amber/yellow" and "straw/yellow green" forming the other class. In the case of stem condition on the same schedule, the color criterion was suppressed. In this case, also, the very few lots placed under the "dry" criterion were simply discarded leaving "pliable" and "fresh" as the basis for the final classification.

It is evident that, in the process of combination, a part of the information contained on the original schedule was sacrificed. The preliminary analyses revealed, however, that the loss of information was not as great as might be assumed from an inspection of the form of the schedule. This is due to the fact that, for each of the characteristics observed, most of the lots were placed in two or, at most, three cells. Study of the frequency distributions aided in the dichotomization in another way. It permitted the formation of some reasonable basis for ordering the criteria within each characteristic for combination into classes. In most cases, the ordering on the schedule is appropriate. However, in the case of color in the 1952 Thompson Seedless schedule, this procedure indicated fairly clearly that the "straw green" criterion belonged with the "green" and "light green" rather than with "amber/yellow" as ordered on the schedule.

---

[5] A similar study on selected vegetables in the Boston wholesale market was made by Waugh in the late 1920's. In that study quantitative measurements were available on most variables entering the analysis. See Frederick V. Waugh, Quality as a Determinant of Vegetable Prices. New York, Columbia University Press, 1929.

The completed schedules did not provide information for analysis on all of the characteristics indicated. For two factors, wetness and waterberry and decay and shatter, no observations were recorded on the schedule. The former defect was not observed to any significant degree while the latter did not lend itself to estimation without considerable handling of the fruit in a lug, a procedure which was not open to us since we did not acquire ownership of the fruit inspected.

On several other factors for which observations were recorded, the completed schedule provided no information for analysis because of the uniformities which existed. In these cases virtually all of the recorded observations fell in a single cell. In each of the three sets of schedules, pack condition was judged to be "firm" for practically every lot. In the 1951 Thompson Seedless study, berry condition was judged uniformly as "firm" and pack treatment uniformly in the "liners" and "cushions" classifications. On this schedule, also, "precooling" and "standard refrigeration" were characteristic of all shipments to the New York auction market. In 1952, on both the Thompson and Tokay schedules, box condition and stenciling and labeling were recorded uniformly as "clean" and "neat," respectively. In addition to the factors on which no information was provided, the taste characteristic was omitted from the 1951 analysis. This was done on the assumption, supported by preliminary analysis, that the information contained in this box of the schedule was adequately reflected by the Balling-acid ratio, an objectively measured magnitude.

In addition to the factors referred to above, several other variables were introduced into the analysis in an effort to account more fully for price behavior on the market. Daily volume of sales on the New York auction, proportion of fruit on each day rated in the preferred fruit quality class, level of daily average price, and day of week represent the variables introduced for this purpose. Information used in defining the first three of these variables was taken from the schedules supplemented by published daily auction records.

The entire set of schedules and supplementary information for the respective seasons was used as a basis for the preliminary work of defining the variables to be analyzed. The regression analyses were based on all schedules for Tokays and on a systematic random sample of schedules ordered by days for Thompson Seedless in both years. The Thompson Seedless schedules were sampled primarily to reduce the analysis to manageable proportions, although no serious loss of information would be expected as a result. The sampling rate was varied in the 2 years so as to give approximately 300 sample schedules (before editing) in each

year.[6] This procedure resulted in a sample of around 22 per cent of the schedules in 1951 and about 12 per cent in 1952. After discarding schedules with missing information, the number of observations entering the analyses was 246 in 1951 and 234 in 1952. There were originally only 225 schedules in the complete set for Tokays. After editing casualties, the number of lot observations remaining for analysis was 198. In editing, schedules on which information on any usable factor was missing were discarded.

After dichotomization of the several qualitative variables, the classes were assigned numerical codes as indicated in Exhibit 2. In each case, the presumably preferred classification has been assigned the higher code which gives rise to the positive coefficient on each judgmental variable. Attention was paid, also, to uniformity in coding in different analyses to facilitate comparison of results between years and between Thompsons and Tokays. The variables on which quantitative measurements were recorded were also introduced into the analyses in coded form. This procedure was adopted to facilitate the rather substantial amount of calculation involved. The coding adopted in these cases is also indicated in Exhibit 2.

Preliminary analysis confirmed the existence of systematic seasonal variation in prices, a phenomenon characteristic of within-season price behavior for many farm products. In our analysis the absolute level of prices is of limited interest, but premiums associated with the various characteristics observed are of primary concern. In order to remove, at least partially, the complications arising from seasonality, each lot price was expressed as a per cent of the average price for the corresponding day. This, in coded form, serves as the dependent variable in each of the regression analyses summarized in this report. Apart from the adjustment for seasonal variation, the price variable thus constructed lends itself to direct interpretation as a measure of percentage premium. For a direct reflection of price premiums, an alternative procedure would have been to transform the price variable to algebraic deviations from the daily mean. Preliminary analysis suggested, however, that this procedure would not have proved as effective in removing the systematic seasonal variation in the price variable.

---

[6] The schedules obtained in the last three weeks in 1952 were discarded in the case of both Thompsons and Tokays since sugar and acid determinations were made on none of the lots observed during this period.

EXHIBIT 2

Code Designation, Variables Entering Analyses of Factors Related to Price Premiums

X_1 Lot price as per cent of daily average	Code	X_2 Fruit quality	Code	X_5 Balling-acid ratio	Code	X_6 Stem condition	Code
A. Thompson Seedless, 1951							
55.0- 59.9	1	Poor Low good Medium good	1	14.0-15.9	1	Pliable	1
60.0- 64.9	2			16.0-17.9	2	Fresh	2
65.0- 69.9	3	Top good Excellent	2	18.0-19.9	3		
70.0- 74.9	4			20.0-21.9	4		
75.0- 79.9	5	X_3 Color		22.0-23.9	5		
80.0- 84.9	6			24.0-25.9	6		
85.0- 89.9	7			26.0-27.9	7	X_8 Mode of shipment	
90.0- 94.9	8	Straw/yellow green Amber/yellow	1	28.0-29.9	8		
95.0- 99.9	9			30.0-31.9	9		
100.0-104.9	10	Light green Green	2	32.0-33.9	10	Freight	1
105.0-109.9	11			34.0-35.9	11	Express	2
110.0-114.9	12	X_4 Berry size (gram weight per berry)		36.0-37.9	12		
115.0-119.9	13			38.0-39.9	13	X_9 Brand	
120.0-124.9	14			40.0-41.9	14		
125.0-129.9	15			42.0-43.9	15		
130.0-134.9	16	1.7-1.9	1	44.0-45.9	16	Nonpremium	1
135.0-139.9	17	2.0-2.2	2			Premium	2
		2.3-2.5	3				
		2.6-2.8	4				

(Continued on next page.)

Exhibit 2 continued.

X_{10} Daily volume of sales thousand lugs	Code	X_{11} Daily per cent of lots rated quality 2	Code	X_{12} Daily average price dollars	Code	X_{13} Day of week	Code
2.0- 3.9	1	0 - 4.9	1	2.10-2.49	1	Monday	1
4.0- 5.9	2	5.0- 9.9	2	2.50-2.99	2	Tuesday	2
6.0- 7.9	3	10.0-14.9	3	3.00-3.49	3	Wednesday	3
8.0- 9.9	4	15.0-19.9	4	3.50-3.99	4	Thursday	4
10.0-11.9	5	20.0-24.9	5	4.00-4.49	5	Friday	5
12.0-13.9	6	25.0-29.9	6	4.50-4.99	6		
14.0-15.9	7	30.0-34.9	7	5.00-5.49	7		
16.0-17.9	8	35.0-39.9	8	5.50-5.99	8		
18.0-19.9	9	40.0-44.9	9	6.00-6.49	9		
20.0-21.9	10	45.0-49.9	10	6.50-6.99	10		
22.0-23.9	11	50.0-54.9	11	7.00-7.49	11		
24.0-25.9	12	55.0-59.9	12				
26.0-27.9	13	60.0-64.9	13				
28.0-29.9	14	65.0-69.9	14				
30.0-31.9	15	70.0-74.9	15				
		75.0-79.9	16				
		80.0-84.9	17				
		85.0-89.9	18				
		90.0-94.9	19				

(Continued on next page.)

Exhibit 2 continued.

X_1 Lot price as per cent of daily average	Code	X_2 Fruit quality	Code	X_5 Balling-acid ratio	Code	X_7 Bunch description	Code
B. Thompson Seedless, 1952							
60.0- 64.9	1	Poor		14.0-15.9	1	Tight	1
65.0- 69.9	2	Low good	1	16.0-17.9	2	Loose	2
70.0- 74.9	3	Medium good		18.0-19.9	3		
75.0- 79.9	4	Top good	2	20.0-21.9	4	X_8	
80.0- 84.9	5	Excellent		22.0-23.9	5	Mode of shipment	
85.0- 89.9	6			24.0-25.9	6		
90.0- 94.9	7	X_3 Color		26.0-27.9	7	Freight	1
95.0- 99.9	8	Amber/yellow	1	28.0-29.9	8	Express	2
100.0-104.9	9			30.0-31.9	9		
105.0-109.9	10	Straw green Light green	2	32.0-33.9	10	X_9 Brand	
110.0-114.9	11	Green		34.0-35.9	11		
115.0-119.9	12			36.0-37.9	12		
120.0-124.9	13	X_4 Berry size		38.0-39.9	13	Nonpremium	1
125.0-129.9	14			40.0-41.9	14	Premium	2
130.0-134.9	15	Small		42.0-43.9	15		
135.0-139.9	16	Medium	1	44.0-45.9	16		
140.0-144.9	17	Large	2				
145.0-149.9	18						
150.0-154.9	19						
155.0-159.9	20						

(Continued on next page.)

Exhibit 2 continued.

X_{10} Daily volume of sales thousand lugs	Code	X_{11} Daily per cent of lots rated quality 2	Code	X_{12} Daily average price dollars	Code	X_{13} Day of week	Code
2.0- 3.9	1	0 - 4.9	1	2.10-2.49	1	Monday	1
4.0- 5.9	2	5.0- 9.9	2	2.50-2.99	2	Tuesday	2
6.0- 7.9	3	10.0-14.9	3	3.00-3.49	3	Wednesday	3
8.0- 9.9	4	15.0-19.9	4	3.50-3.99	4	Thursday	4
10.0-11.9	5	20.0.24.9	5	4.00-4.49	5	Friday	5
12.0-13.9	6	25.0-29.9	6	4.50-4.99	6		
14.0-15.9	7	30.0-34.9	7	5.00-5.49	7		
16.0-17.9	8	35.0-39.9	8	5.50-5.99	8		
18.0-19.9	9	40.0-44.9	9	6.00-6.49	9		
20.0-21.9	10	45.0-49.9	10	6.50-6.99	10		
22.0-23.9	11	50.0-54.9	11	7.00-7.49	11		
24.0-25.9	12	55.0-59.9	12				
26.0-27.9	13	60.0-64.9	13				
28.0-29.9	14	65.0-69.9	14				
30.0-31.9	15	70.0-74.9	15				
		75.0-79.9	16				
		80.0-84.9	17				
		85.0-89.9	18				
		90.0-94.9	19				

(Continued on next page.)

Exhibit 2 continued.

X_1 Lot price as per cent of daily average	Code	X_2 Fruit quality	Code	X_5 Balling-acid ratio	Code	X_7 Bunch description	Code
C. Tokay, 1952							
75.0- 79.9	1	Poor Low good Medium good	1	28.0-29.9	1	Tight	1
80.0- 84.9	2			30.0-31.9	2	Loose	2
85.0- 89.9	3			32.0-33.9	3		
90.0- 94.9	4	Top good Excellent	2	34.0-35.9	4	X_8 Mode of shipment	
95.0- 99.9	5			36.0-37.9	5	Freight	1
100.0-104.9	6	X_3 Color		38.0-39.9	6	Express	2
105.0-109.9	7	Pink 25 per cent	1	40.0-41.9	7	X_9 Brand	
110.0-114.9	8	Purple 50 per cent	2	42.0-43.9	8	Nonpremium	1
115.0-119.9	9			44.0-45.9	9	Premium	2
120.0-124.9	10	X_4 Berry size		46.0-47.9	10		
125.0-129.9	11	Small Medium	1	48.0-49.9	11		
130.0-134.9	12	Large	2	50.0-51.9	12		
				52.0-53.9	13		
				54.0-55.9	14		
				56.0-57.9	15		
				58.0-59.9	16		
				60.0-61.9	17		
				62.0-63.9	18		
				64.0-65.9	19		
				66.0-67.9	20		

(Continued on next page.)

Exhibit 2 continued.

X_{10} Daily volume of sales thousand lugs	Code	X_{11} Daily per cent of lots rated quality 2	Code	X_{12} Daily average price dollars	Code	X_{13} Day of week	Code
0 - 0.9	1	0 - 4.9	1	1.60-1.99	1	Monday	1
1.0- 1.9	2	5.0- 9.9	2	2.00-2.49	2	Tuesday	2
2.0- 2.9	3	10.0-14.9	3	2.50-2.99	3	Wednesday	3
3.0- 3.9	4	15.0-19.9	4	3.00-3.49	4	Thursday	4
4.0- 4.9	5	20.0-24.9	5	3.50-3.59	5	Friday	5
5.0- 5.9	6	25.0-29.9	6				
6.0- 6.9	7	30.0-34.9	7				
7.0- 7.9	8	35.0-39.9	8				
8.0- 8.9	9	40.0-44.9	9				
9.0- 9.9	10	45.0-49.9	10				
10.0-10.9	11	50.0-54.9	11				
11.0-11.9	12	55.0-59.9	12				
		60.0-64.9	13				
		65.0-69.9	14				
		70.0-74.9	15				
		75.0-79.9	16				
		80.0-84.9	17				
		85.0-89.9	18				
		90.0-94.9	19				

(Continued on next page.)

The notation used to identify the individual characteristics in the analyses summarized in the following section is as follows:

X_1 = Lot price per lug as per cent of unweighted daily average price over lots

X_2 = Fruit quality

X_3 = Color

X_4 = Berry size

X_5 = Balling-acid ratio

X_6 = Stem condition

X_7 = Bunch description

X_8 = Mode of shipment

X_9 = Brand

X_{10} = Daily volume of sales

X_{11} = Daily per cent of lots rated quality 2

X_{12} = Daily average price

X_{13} = Day of week

Uniform notation is employed in the three sets of data to facilitate comparison of the results, although certain variables do not enter all analyses.

In Exhibit 2 it will be observed that the variables X_2, X_3, X_6, X_7, X_8, and X_9 represent dichotomized variables which take on values of either 1 or 2 in each analysis in which they appear. Dichotomization has been accomplished in the first four of these by suppression of certain criteria and/or the combination of appropriate classifications appearing on the schedules. The mode of shipment variable represents freight and express coded 1 and 2, respectively. The brand classification was constructed with the intent of reflecting roughly premium versus nonpremium brands. A brand was classified as premium if the price which it commanded exceeded the lot average price on the corresponding day more frequently than it fell below the average. The definition of brand classes was based on the entire set of lots observed. Premium and nonpremium brands were assigned codes 2 and 1, respectively. Due to the substitution of judgmental observations on berry size in 1952 for the weight measurements employed in 1951, dichotomization of this variable was necessary in 1952.

Quantitative measurements were available on X_1, X_5, X_{10}, X_{11}, and X_{12}. As has been indicated, however, these variables also enter our analyses in coded form. Coding in each case was determined on the basis of the frequency distribution of observations. Arbitrary class intervals were defined in each case and codes assigned to the ordered class intervals. The variable X_{13} was constructed by assigning the numbers 1 through 5 to the days, Monday through Friday, respectively. This procedure is admittedly arbitrary. The supposition that the effects of the several qualitative characteristics on percentage price premiums may be different on different days of the week seems plausible. However, there seems little a priori basis for either the order or the relationship between the different days incorporated in the procedure indicated. For this reason, separate analyses have been undertaken for each day of the week in each case.

In addition to the variables defined above, selected joint relationships have been investigated through the introduction into the analyses of appropriate product terms and coded combinations of factors. These terms will be given more explicit form in the presentation of results which follows.

Summary of Results

The results of analyses such as those summarized here take on significance only insofar as they aid in appraising the preferences of buyers in the market place. If buyers' decisions with respect to the purchase of a particular lot of fruit in the auction are based on inspection of displayed lugs, this suggests the existence of systematic relations between observable characteristics of the fruit displayed and the price which it commands in the auction room. The auction market is considered a particularly appropriate place to observe the price-making process in action since the fruit is open for all to see and preferences find explicit expression in the bidding process. The lag between sale of the fruit on the auction floor and purchase by consumers is relatively short. It is reasonable to suppose that consumer reaction to a particular lot of grapes may be reflected in buyer behavior in the auction in a relatively short time. Incidents reflecting this kind of sensitivity are not unusual. For example, brands of fruit normally running strong in quality have been observed to enter a temporary slump with respect to particular important characteristics. Observation on the market suggested in these cases that three to four days was adequate time for the appearance of the inferior product to be reflected in the price behavior of this brand relative to other fruit. About the same amount of time was required to regain the price position after the quality deficiency had been corrected.

The characteristics included on the schedule for observation represent those which growers, packers, and production specialists considered important as quality identifying factors. From an economic point of view, the most meaningful definition of quality is to be found in the expression of consumer preferences in the market. Hence, if the commonly held concepts of fruit quality are economically meaningful, one would expect this to be reflected in the price structure in the market. From this point of view, this analysis may be regarded as an attempt to assemble some evidence which might be useful for appraising the popularly held views regarding the relative importance of various fruit and pack characteristics.

In the presentation of results which follows, the 1951 Thompson analyses are discussed in somewhat more detail than the 1952 Thompsons or Tokays. The reader will have no difficulty in fitting the results of the analyses of the latter year into the framework of the discussion of the 1951 results.

Thompson Seedless, 1951.--Selected equations from the 1951 Thompson Seedless analysis are exhibited in Table 1. In presenting the results, the practice has been adopted of presenting regression coefficients in three forms: in standardized units (β), in coded units (b), and in price percentage premium units (b'). The beta coefficients (β) permit direct comparisons in standardized units of the coefficients in a given equation.[7] The b coefficients are those coming directly from the analyses. The b' coefficients are presented to facilitate interpretation directly in terms of the original units of the dependent variable, that is, per cent of average price.

Coefficients of only three of the variables reflecting fruit characteristics appear statistically significant. These variables are fruit quality (X_2), size (X_4), and stem condition (X_6). The positive relation with X_2 indicates that, on the average, lots recorded as "excellent" and "top good" commanded a premium over lots placed in the lower fruit quality category. The positive coefficient of X_4 indicates that larger berries commanded premiums over smaller berries while the relation with X_6 suggests that "pliable" stems are discounted in favor of "fresh" stems. No ambiguity should exist with respect to the

---

[7] The beta coefficients are the regression coefficients which result when each variable is expressed in units of its standard deviation. It is in this sense that the units are standardized. In a descriptive interpretation of our results, the beta coefficients in a given equation lend themselves to direct comparison since their magnitudes are not affected by the unit of measurement of the original variable.

TABLE 1

Regression Coefficients and Supplementary Measures, Thompson Seedless Seasonal Equations, 1951a/ (X_1 dependent)

n = 246

Equation	Constant term		Independent variables								R^2	$\bar{R}$
			X_2	X_4	X_6	X_8	X_9	X_{10}	X_{11}	X_{12}		
1	0.982	β	0.217	0.184	0.096	0.354	0.208				.5486	.7343
		b	1.271	0.611	0.570	1.970	1.160					
		b'	6.36	3.06	2.85	9.85	5.80					
		t	4.17	4.10	2.06	5.94	3.78					
2	-0.082	β	0.219	0.188	0.105	0.341	0.224	0.111			.5607	.7414
		b	1.280	0.626	0.625	1.897	1.249	0.172				
		b'	6.40	3.13	3.12	9.48	6.24	0.86				
		t	4.25	4.25	2.28	5.76	4.09	2.57				
3	0.636	β	0.237	0.161	0.107	0.353	0.217	0.90	-0.089		.5670	.7445
		b	1.391	0.535	0.635	1.963	1.212	0.138	-0.081			
		b'	6.96	2.68	3.18	9.82	6.06	0.69	-0.40			
		t	4.55	3.46	2.33	5.96	3.98	2.00	1.87			
4	1.695	β	0.226	0.186	0.097	0.346	0.215			-0.072	.5537	.7365
		b	1.326	0.620	0.579	1.924	1.196			-0.211		
		b'	6.63	3.10	2.90	9.62	5.98			-1.06		
		t	4.34	4.17	2.10	5.80	3.90			1.65		

a/ Variables identified in Exhibit 2, pp. 12-17. Approximate t-ratio at 5-per cent level of significance is 1.96.

interpretation of the berry size relation but, in the case of X_2 and X_6, this interpretation may not be so clear cut. This is particularly true in the case of X_2. As was indicated in the previous section, there remains considerable ambiguity concerning the specific fruit and pack characteristics or combination of characteristics which served as the basis for the classification of a lot of fruit with respect to X_2. In part, the classification with respect to fruit quality was based on some weighted combination of the other characteristics appearing on the face of the schedule.[8/] The significance of X_2 in these equations, however, suggests that additional fruit or pack characteristics are reflected in X_2 which are not recorded specifically on the schedule.

It is not difficult to conceive of specific additional factors which could have entered in this determination. Within-lug uniformity of factors, such as berry size and color, is not reflected by the observations of individual characteristics and could be reflected in this variable. In addition, there are such attributes as general condition and general appearance of the fruit which are not called for explicitly on the schedule. These attributes may reflect maturity at time of picking, lag between time of packing and sale, and treatment in shipment, giving rise to bruising, decay, or overripeness--conditions which may seriously affect the keeping qualities of the fruit. More useful results from the standpoint of appraisal of shipping practices might well have been forthcoming from identifying these individual characteristics and observing each separately. As has been indicated, however, the fruit and pack characteristics more directly identifiable with cultural practices at the grower level and packaging processes at the packer level were of primary interest in this study.

The ambiguity with respect to the stem condition variable is also worth noting. The question here concerns what specific undesirable attribute is reflected by "pliable" stems. The degree of shatter would be expected to be higher with "pliable" than with "fresh" stems. On the other hand, it may be a combination of fruit characteristics typically associated with "pliable" stems which is significant here. This set of traits might serve, for example, to forewarn the buyer of inferior keeping qualities of the fruit.

In addition to fruit quality, size, and stem condition, other variables appear in Table 1 to be significantly related to percentage price. Notable among

---

[8/] The multiple correlation with X_2 dependent and X_3, X_4, X_5, and X_6 independent is 0.67.

these are mode of shipment (X_8) and brand (X_9). Here, likewise, the direction of the relations seems reasonable although the magnitude of the effects, considered net of the fruit characteristics included in the equations, is in each case somewhat larger than might be expected. These results indicate that, for a given combination of fruit quality, berry size, and stem condition, express shipments command a price premium over freight shipments. Similarly, the significant brand relation suggests a premium associated with brand name as such. Again, however, it is not clear precisely what is reflected by these relations. It is plausible to suppose that mode of shipment is related to condition of fruit on arrival at distant markets. Brand, also, may reflect a combination of desirable fruit characteristics not adequately reflected by the remaining variables introduced explicitly. The correlation between each of these factors and fruit quality supports this supposition.[9] The small number and perhaps highly selective lugs in each lot that were opened for inspection may well have led to the situation in which the observations recorded have not reflected accurately the fruit and pack characteristics of the lots sold. Whatever the specific causes, the existence of significant relations between percentage price and these two factors in this year cannot be discarded. The conclusion that the net effects which appear for mode of shipment and brand have no foundation in the quality of the fruit and pack is perhaps premature, but this possibility cannot be excluded on the basis of these results. The uncertainty which remains with regard to the correct interpretation of the estimated relation between price premiums and these two variables emphasizes the necessity for identifying and incorporating in the analysis the distinguishing characteristics which make mode of shipment and brand the dominant variables in the "explanation" of price premiums.

Aside from the attributes identifiable with individual lots of fruit, other measures reflecting more directly the market conditions on a given market day might well enter to influence price premiums. It is this reasoning which lies behind the introduction of selected "market variables" into our analysis of price premiums associated with individual lots. Daily average price level (X_{12}) is one such variable. The average level of price over lots on any given day may be taken to represent, in a sense, the strength of the market on that day. Introduction

---

[9] The simple correlation coefficients of fruit quality with mode of shipment and brand are, respectively, 0.51 and 0.43.

of this variable explicitly is to recognize the possibility that percentage premiums for preferred combinations of fruit characteristics may be different in magnitude under circumstances which give rise to a strong market as opposed to conditions giving rise to a weak market. The coefficient of X_{12}, when added to equation 1, was negative but was not statistically significant. The conclusion would seem to follow from the lack of significance that price premiums (and discounts) remained fairly uniform percentagewise over the range of price variation represented by our 1951 Thompson data.

Daily volume of sales (X_{10}) and daily per cent of lots rated quality 2 (X_{11}) represent the other "market variables." Volume of sales reflects the supply of fruit on the market. The premiums paid for a given combination of fruit characteristics might well be different on days of heavy volume and on days of light volume. Equation 2 in Table 1 reflects the effect of the introduction of this variable. The significant positive coefficient of X_{10} in this equation suggests that an increase in volume of sales was associated with an increase in percentage premiums for a given combination of the remaining characteristics incorporated in the equation. It likewise indicates that percentage discounts are lower on heavy volume days. Due to the significant negative relation between volume of sales and daily level of price (-0.48), the possibility must be recognized that the relation of premiums to volume is, to a certain extent, a reflection of the premium relation with price level. With the introduction of price level in equation 3, the coefficient of X_{10} remains relatively stable, but statistical significance of X_{10} is not established in the formulation including X_{12}.

Daily per cent of lots rated quality 2 (X_{11}) has been added in equation 3 to reflect the daily composition with respect to the qualitative characteristics of fruit sold on the auction market. The choice of this measure for this purpose is not considered completely appropriate in view of the uncertainty as to the combination of fruit characteristics reflected. On the other hand, it would appear to be the most appropriate single variable available to us reflecting "desirable" combinations of fruit characteristics associated with lots. Although the negative relation between X_{11} and percentage premium would appear reasonable, it is noted that our results also indicate that the relation is not statistically significant.

The possibility of joint relations between selected individual characteristics and a variable reflecting strength of the market was also given explicit recognition in our analysis. This allows for the possibility that net effect on

percentage premiums of express over freight shipments, for example, might itself depend upon the market conditions reflected by our price level variable.

One form of joint relation is reflected by the introduction of the appropriate product terms as separate variables in the regression equation. This procedure was adopted. The product of X_{12} with each of the variables X_4, X_8, and X_9 was introduced successively into equation 3 of Table 1.[10/] No product terms were significant in these formulations.

Joint effects of several of the fruit characteristics in combination were also tested by a different procedure. Combinations of the factors X_2, X_4, and X_6 were investigated. The following illustrates the procedure. Lots of fruit exhibiting fruit quality 2, berry size 3 or 4, and stem condition 2 simultaneously were assigned the value 2 while the remaining lots were assigned the value 1. This new variable was introduced into equation 3 in an attempt to obtain an approximate measure of the added effect of this combination of fruit characteristics. The coefficient was not significant. Various combinations of 2 of these factors were introduced successively by a similar procedure. None of the coefficients proved significant.

The analysis thus far has not recognized the possibility that buyers' reaction to various fruit characteristics might well be different on different days of the week. This possibility would seem a real one. Without a great deal of information about the retail outlets served by the auction and their buying habits, however, it is impossible to formulate meaningful a priori expectations concerning the effects of such factors on the behavior of price premiums over the days of the week. It is not inconceivable, for example, that purchases on the New York auction market on particular days are dominated by retail outlets serving more highly discriminating customers. It is possible, also, that retail outlets in the aggregate may be faced on different days of the week with customers who, on the average, exhibit somewhat different preferences with respect to fresh grapes. Another possibility which would seem plausible is that retailers may well attach relatively heavier weight to keeping quality at different times during the week. Buying practices with regard to keeping quality would be expected to be geared to variations in lag in movement through the retail store. Produce

---

[10/] It is noted that the results of this procedure, involving as it does the product of coded variables, are not independent of the codes assigned to the variables.

placed in the retail display bin on heavy shopping days moves relatively more quickly than fruit displayed on other days. To the extent that there exists some uniformity in time patterns of shopping habits in the area served by the New York auction market, this would be expected to be reflected in the character of the demand for fresh fruit on this market. Other factors traceable to consumer behavior in the retail market may exist which, in turn, find expression in the behavior of auction buyers on different days of the week.

Two formulations which give explicit recognition to day of the week were considered in this study: (1) the introduction of day of the week as a variable in the seasonal analysis and (2) separate analyses for each day of the week. The first formulation involves assigning numerical values to different days of the week. One possible technique, of course, is to assign the numbers, one through five, to the days, Monday through Friday, consecutively. This procedure is obviously extremely arbitrary since there is no basis for assuming that the relationship between days of the week is reflected by either the order or the magnitudes thus assigned. Recognizing the arbitrariness of this procedure, day of the week was nevertheless introduced into the seasonal analysis in an effort to detect systematic shifts associated with this variable where they existed. Whether or not day of the week proved significant, the data were subjected to separate daily analyses, and main reliance was placed on the separate analyses in exploring the possible changes in patterns of relations associated with day of the week. The reduction in degrees of freedom in the daily analyses made for somewhat larger standard errors of the coefficients. Although the loss of precision could have been partially offset by augmenting the daily samples in the Thompson Seedless analyses, this procedure was not adopted.

Day of the week, introduced as a separate variable in the seasonal analysis of 1951 Thompson Seedless, did not prove significant. This suggests only that the systematic linear effect specified by our model is not supported by our data. Selected equations from the separate daily analyses are summarized in Table 2. The equations presented include only those variables which were significant in the seasonal results. The variables X_3, X_5, and X_{11} proved not to be significant in the daily analyses as was the case in the seasonal analysis.

The results by day of the week lend themselves easily to specific comparisons by the reader. The differences which appear in the coefficients of a given variable on different days of the week may be considered suggestive, although the interpretation of these differences is difficult without more information about the market served by the New York auction. It is appropriate to point out also

TABLE 2

Regression Coefficients and Supplementary Measures, Thompson Seedless Daily Equations, 1951[a]
(X_1 dependent)

Equation	n	Constant term	Independent variables							R^2	$\bar{R}$
				X_2	X_4	X_6	X_8	X_9	X_{10}		
Monday											
1	45	2.478	β	0.584	0.040	0.028	0.217	0.019		.5424	.6955
			b	3.432	0.134	0.183	1.214	0.105			
			b'	17.16	0.67	0.92	6.07	0.52			
			t	3.03	0.36	0.21	1.35	0.14			
2	45	-1.074	β	0.463	0.082	0.051	0.294	0.055	0.311	.6282	.7546
			b	2.718	0.275	0.332	1.648	0.306	0.418		
			b'	13.59	1.38	1.66	8.24	1.53	0.21		
			t	2.56	0.81	0.41	1.98	0.44	2.96		
Tuesday											
3	50	-0.329	β	0.336	0.226	0.059	0.392	0.167		.7364	.8405
			b	1.892	0.836	0.323	2.122	0.905			
			b'	9.46	4.18	1.62	10.61	4.52			
			t	3.05	2.67	0.68	3.25	1.47			
4	50	-1.223	β	0.329	0.213	0.068	0.405	0.181	0.093	.7444	.8418
			b	1.852	0.788	0.373	2.188	0.980	0.159		
			b'	9.26	3.94	1.86	10.94	4.90	0.80		
			t	2.99	2.50	0.78	3.36	1.59	1.16		

(Continued on next page.)

Table 2 continued.

Equation	n	Constant term	Independent variables							R^2	$\bar{R}$
				X_2	X_4	X_6	X_8	X_9	X_{10}		
Wednesday											
5	52	-1.424	β	0.245	0.240	0.206	0.297	0.274		.6132	.7557
			b	1.583	0.856	1.437	1.798	1.671			
			b'	7.92	4.28	7.18	8.99	8.36			
			t	2.36	2.27	1.84	2.53	2.47			
6	52	-2.706	β	0.263	0.219	0.191	0.251	0.316	0.120	.6256	.7587
			b	1.699	0.782	1.337	1.523	1.923	0.310		
			b'	8.50	3.91	6.68	7.62	9.62	1.55		
			t	2.52	2.06	1.71	2.05	2.73	1.22		
Thursday											
7	46	0.451	β	0.129	0.229	0.006	0.409	0.241		.5773	.7242
			b	0.835	0.758	0.037	2.450	1.467			
			b'	4.18	3.79	0.18	12.25	7.34			
			t	1.05	1.90	0.05	2.65	1.71			
8	46	1.728	β	0.116	0.267	0.037	0.419	0.231	-0.137	.5940	.7291
			b	0.747	0.886	0.231	2.507	1.408	-0.323		
			b'	3.74	4.43	1.16	12.54	7.04	-1.62		
			t	0.94	2.17	0.32	2.73	1.65	1.27		

(Continued on next page.)

Table 2 continued.

Equation	n	Constant term		Independent variables						R^2	$\bar{R}$
				X_2	X_4	X_6	X_8	X_9	X_{10}		
Friday											
9	53	1.881	β	0.021	0.352	0.278	0.226	0.299		.5862	.7363
			b	0.101	0.968	1.366	1.072	1.410			
			b'	0.50	4.84	6.83	5.36	7.05			
			t	0.19	3.60	2.82	1.74	2.37			
10	53	1.924	β	0.020	0.350	0.278	0.228	0.300	-0.004	.5862	.7297
			b	0.095	0.965	1.365	1.080	1.410	-0.008		
			b'	0.48	4.82	6.82	5.40	7.05	-0.04		
			t	0.17	3.36	2.79	1.64	2.34	0.04		

a/ Variables identified in Exhibit 2, pp. 12-17. Approximate t-ratio at 5-per cent level of significance is 2.02.

that, with the exception of X_2, the maximum differences in the daily coefficients would not appear to be statistically significant when the magnitudes of the standard errors are taken into account.

Our daily results with respect to two variables might be noted in particular. First, it would appear that the general appearance of fruit as reflected by X_2 is significant in influencing percentage premiums only in the early part of the week. In fact, this variable seems to be the dominant factor on the Monday market. It is possible that the dominance of X_2 on Monday may reflect the effect of advancement in fruit maturity due to the added delays associated with the week-end market holiday. Second, stem condition (X_6) appears to be a statistically significant variable only on Friday, although the influence of this variable on Wednesday cannot be ignored. It is possible that this Friday relation may also be attributable to the week-end market holiday. It seems a plausible assumption that "fresh" stems as opposed to "pliable" stems represent from among our variables the strongest indicator of keeping quality of the fruit Its significance on Friday may reflect an attempt by buyers in the auction market to protect themselves against losses through deterioration before the fruit reaches the retail outlet early in the following week.

Returning to the seasonal analysis, a direct interpretation of the b' coefficients of equation 3 (Table 1) may serve to clarify the nature of our results. The coefficient of X_2, for example, indicates that, for a given combination of other characteristics represented in this equation, lots classified as quality 1 sold at a price which, on the average, was around 7 percentage points less than quality 2 fruit. Percentage points in this case are with reference to daily average price. That is, if quality 2 fruit sold at 103 per cent of the average price for the day, quality 1 fruit possessing the same combination of other characteristics sold at 96 per cent of the average price for the day. The b' coefficients of the other dichotomized variables are interpreted in the same way. With respect to berry size, weight measurements enter directly into our 1951 equations. The percentage coefficient here indicates that, for given combinations of the remaining factors, a decrease of 0.3 gram in weight per berry was associated, on the average, with a decrease of 2.7 percentage points in price. Interpretation of the coefficients of X_{10} and X_{11} in terms of the original units of these variables can be easily made by referring to Exhibit 2.

Extension of our interpretation to monetary units may also be accomplished by applying the percentage coefficients to different daily average price levels through the season. For purposes of illustration, it would seem appropriate to

use the average price over days covered by our study as the basis for our calculations. The average price for the period covered by our 1951 study was $3.70 per lug. A straightforward application of the above-indicated percentage premium associated with fruit quality to this price base indicates a price premium of around 26 cents for quality 2 over quality 1 fruit. The absolute price premiums corresponding to the coefficients of equation 3 in the 1951 analysis and each of the 1952 analyses are shown in Table 3. In each case the dollar price premiums are based on the average price over days covered by our data. Obviously, the absolute price premium resulting from the linear percentage premium relation increases as the daily average price to which it is applied increases.

Thompson Seedless, 1952.--As has been indicated, certain differences exist between the data which form the basis for the 1951 and 1952 analyses in Thompsons. The period observed in 1952 was about twice as long. Hence, the 1952 data include observations of early season Thompsons from the Coachella and Imperial areas as well as the later season fruit marketed in volume from Fresno and Tulare. The fruit characteristics associated with marketing practices in different areas are thus more fully represented, and the amplitude of the variation in price level over the season is more marked in the latter year. With respect to information recorded, also, differences appear in the two years. Stem condition was not observed in 1952, and qualitative judgments were recorded on berry size rather than actual weight measurements. Taste was not recorded as such in 1952 while box condition and labeling were observed. As has been indicated, however, observations on these latter factors were considered to provide little or no information for analysis so their inclusion or exclusion is of no particular consequence.

With regard to procedure of analysis, it was possible to take into account position in sale in 1952. This was done in preliminary formulations which included position in sale as a separate variable. Lots sold in the first position were assigned the value 2 while other lots were assigned the value 1. This procedure revealed no systematic relation between position in sale and percentage premium. Other preliminary formulations excluded those lots occupying the first position from the analysis. This procedure resulted in a slightly improved fit as measured by the multiple correlation coefficient. This suggests the possibility that price behavior of fruit sold early in the day reflected, to a certain extent, a process of "feeling out the market," and that the inclusion of these lots might tend to obscure the underlying relations between price premiums and fruit characteristics. Although the evidence provided by preliminary analyses was not considered conclusive on this point, the results here summarized are based

TABLE 3

Net Regression Coefficients Converted to Dollar Units, Selected Seasonal Equations, Thompson Seedless and Tokay[a]

Equation[b]	Average price	Independent variables										
		X_2	X_3	X_4	X_5	X_6	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}
Thompson Seedless--1951												
3	$3.70	0.258		0.099		0.118	0.363	0.224	0.026	-0.015		
Thompson Seedless--1952												
3	$3.62	0.223	0.151	0.280	0.018		0.381	0.486			-0.045	-0.078
Tokay--1952												
3	$2.57		0.128	0.155				0.440		-0.019		0.033

a/ Variables identified in Exhibit 2, pp. 12-17.

b/ Refers to equation number in original tables in which seasonal results appear.

on the set of observations which excludes those lots which fell in the first position in sale. It remains questionable whether the results would have differed materially had the first position been included.

Selected equations from the 1952 seasonal analysis are summarized in Table 4. A somewhat lower multiple correlation is characteristic of the equations fitted to the 1952 data. Although the absence of precise measurement on an important variable like berry size may offer a partial explanation for this difference, the possibility that this lower correlation is attributable to the longer period observed cannot be discarded. It would not be surprising, for example, if the individual characteristics influencing price premiums entered our relations to a different degree at different points in the season. Furthermore, as the period of observation is lengthened, the possibilities for the omission of significant variables in our framework may well multiply.

Turning to the effects of the several factors observed, the similarities of the 1952 and 1951 results are perhaps more noteworthy than their differences. With respect to factors identifiable with lots, brand name (X_9) and mode of shipment (X_8) are dominant, exhibiting highly significant effects on price premiums in each formulation. With regard to characteristics associated with the fruit as such, berry size (X_4) appears again as the most significant factor, and fruit quality (X_2) displays a significant effect consistently in each formulation. The effects attributable to fruit characteristics in the 1952 results differ from 1951 primarily in that color (X_3) and Balling-acid ratio (X_5) appear significant or nearly significant in each of the formulations for the latter year. It is possible, due to the overlapping of marketings from more areas of origin during the longer period observed in 1952, that auction buyers were confronted with a wider range of combinations of fruit characteristics on given days than was the case in the shorter period observed in 1951. If so, price premiums associated with selected factors might be expected to be reflected more strongly in the 1952 data. Color and Balling-acid ratio, both being associated with maturity of fruit, might well exhibit somewhat stronger effects under these circumstances. The possibility cannot be overlooked, of course, that color in 1952 carries the role carried by stem condition in 1951. This supposition is not supported, however, by the rather low correlation between these two characteristics exhibited by the 1951 data (0.18).

The signs of the coefficients of each of the above variables are consistent with those exhibited in the 1951 analysis and with a priori expectations. Viewing the beta coefficients as approximate indications of relative importance, the

TABLE 4

Regression Coefficients and Supplementary Measures, Thompson Seedless Seasonal Equations, 1952a/ (X_1 dependent)

n = 234

Equation	Constant term	Independent variables									R^2	$\bar{R}$
			X_2	X_3	X_4	X_5	X_8	X_9	X_{12}	X_{13}		
1	-.4793	β	0.145	0.102	0.224	0.130	0.254	0.335			.4634	.6702
		b	1.201	0.893	1.775	0.147	1.970	2.723				
		b'	6.00	4.46	8.88	0.74	9.85	13.62				
		t	2.19	2.08	3.48	2.48	4.56	6.23				
2	-3.108	β	0.152	0.085	0.193	0.076	0.285	0.320	-0.132		.4746	.6770
		b	1.260	0.743	1.526	0.086	2.213	2.603	-0.286			
		b'	6.30	3.72	7.63	0.43	11.06	13.02	-1.43			
		t	2.32	1.72	2.95	1.32	5.00	5.96	2.20			
3	-2.214	β	0.148	0.095	0.195	0.089	0.271	0.330	-0.114	-0.153	.4976	.6926
		b	1.231	0.832	1.547	0.100	2.105	2.683	-0.247	-0.431		
		b'	6.16	4.16	7.74	0.50	10.52	13.42	-1.24	-2.16		
		t	2.31	1.97	3.05	1.56	4.83	6.26	1.93	3.21		
4	-0.765	β	0.154	0.087	0.183		0.253	0.329	-0.154	-0.148	.4921	.6902
		b	1.282	0.767	1.453		1.963	2.672	-0.334	-0.417		
		b'	6.41	3.84	7.26		9.82	13.36	-1.67	-2.08		
		t	2.40	1.81	2.87		4.60	6.21	2.88	3.10		
5	-3.608	β	0.142	0.110	0.222	0.136	0.244	0.344		-0.162	.4893	.6881
		b	1.179	0.966	1.762	0.153	1.890	2.791		-0.456		
		b'	5.90	4.83	8.81	0.76	9.45	13.96		-2.28		
		t	2.20	2.30	3.54	2.64	4.46	6.52		3.38		

a/ Variables identified in Exhibit 2, pp. 12-17. Approximate t-ratio at 5-per cent level of significance is 1.96.

main difference in the results is to be found in the interchange of position of mode of shipment and brand in the two years.

Extending the analysis to include variables reflecting market conditions as opposed to lot characteristics, it appears that both price level and day of the week are systematically related to percentage premiums in 1952. It will be recalled that neither of these variables was significant in 1951. The negative sign of the price level variable (X_{12}) suggests that, given a particular combination of lot characteristics, the percentage premium is smaller (or the percentage discount is larger), the higher the level of price prevailing on the market.[11] The remaining variable which appears significant is day of the week. The negative sign of this coefficient suggests a systematic net decrease in percentage premiums as the week progresses. Stated directly in terms of percentage premiums, our results indicate that a lot of fruit exhibiting a given combination of the other factors commanded, on the average, a percentage premium around 2 points less on Tuesday than on Monday and similarly for each successive day as the week progressed. The arbitrariness involved in the introduction of day of the week in the way in which it has been introduced here was recognized in connection with the 1951 analysis. Its significance in this formulation suggests the existence of a systematic relation with percentage premium. But a more thorough familiarity with marketing practices beyond the auction level might suggest a different relation than that exhibited by our analysis.

Product terms of X_{12} with X_2, X_4, X_8, and X_9 were added successively to equation 3. In no case was there a significant additional effect associated with the product term.

Selected results from the 1952 daily analyses are presented in Table 5. The equation presented for each day includes only variables identifiable with lots

---

[11] The proper interpretation of the significance of X_{12} is not clear. If there were no relation between lot prices (numerator of X_1) and X_{12}, a negative relation between X_1 and X_{12} would be expected since X_{12} is the denominator of X_1. In this case, X_{12} is a linear function of prices over all lots on a given day. The negative relation with X_1 may arise primarily from the relation of X_{12} to the distribution of quality of lots on which X_{12} is based. A correlation of 0.42 between X_{12} and X_9 lends some support to this view. This suggests that some other base price for X_1 might have been preferable. A daily price base which adequately reflects seasonal variation but is not derived directly from lot prices on the corresponding day might serve this purpose somewhat better. Introduction of X_{12}, as in our formulation, would not seem an objectionable procedure, but caution must be exercised in interpreting the resulting coefficient.

TABLE 5

Regression Coefficients and Supplementary Measures, Thompson Seedless Daily Equations, 1952[a]
(X_1 dependent)

Equation	n	Constant term	Independent variables							R^2	$\bar{R}$
				X_2	X_3	X_4	X_5	X_8	X_9		
						Monday					
1	55	-6.538	β	0.101	0.236	0.222	0.166	0.372	0.243	.4135	.5832
			b	0.849	2.058	1.807	0.192	3.092	1.998		
			b'	4.24	10.29	9.04	0.96	15.46	9.99		
			t	0.63	2.05	1.45	1.23	2.71	1.97		
						Tuesday					
2	39	-8.090	β	0.222	0.075	0.275	0.307	0.237	0.273	.5958	.7211
			b	1.937	0.705	2.402	0.457	2.038	2.442		
			b'	9.68	3.52	12.01	2.28	10.19	12.21		
			t	1.54	0.64	1.79	2.50	1.74	2.09		
						Wednesday					
3	52	-4.570	β	0.187	0.187	0.160	0.038	0.102	0.454	.5076	.6648
			b	1.619	1.591	1.239	0.041	0.789	3.670		
			b'	8.10	7.96	6.20	0.20	3.94	18.35		
			t	1.34	1.70	1.25	0.34	0.80	3.81		

(Continued on next page.)

Table 5 continued.

Equation	n	Constant term	Independent variables							R^2	$\bar{R}$
				X_2	X_3	X_4	X_5	X_8	X_9		
						Thursday					
4	58	-3.827	β	0.087	0.020	0.307	0.181	0.295	0.398	.5155	.6772
			b	0.600	0.157	2.079	0.166	1.875	2.698		
			b'	3.00	.78	10.40	0.83	9.38	13.49		
			t	0.45	0.20	1.81	1.70	2.79	3.66		
						Friday					
5	30	-3.803	β	0.149	0.005	0.258	0.098	0.079	0.454	.5726	.6790
			b	1.251	0.045	2.059	0.110	0.633	3.802		
			b'	6.26	0.22	10.30	0.55	3.16	19.01		
			t	0.73	0.03	1.12	0.57	0.42	2.85		

a/ Variables identified in Exhibit 2, pp. 12-17. Approximate t-ratios at 5-per cent level are: Monday, Wednesday, and Thursday, 2.02; Tuesday, 2.04; and Friday, 2.07.

and is directly comparable with the seasonal equation 1 in Table 4. The variables represented in the 1952 daily analyses differ from 1951 in that color (X_3) and Balling-acid ratio (X_5) are included in the latter year while stem condition (X_6) and daily volume of sales (X_{10}) do not appear. The first two variables do not appear in the 1951 daily analyses because neither appears significant in that year. The variable X_{10} has not been introduced into the 1952 daily analyses because of its apparent lack of significance in the seasonal analysis.

A comparison of the 1951 and 1952 daily results reveals something less than a high degree of consistency in these two years. Brand name (X_9) is the only variable uniformly significant through the week in 1952. For mode of shipment (X_8), which appears as a highly significant variable on four days in 1951, statistical significance is established in 1952 on only two days--Monday and Thursday. With respect to fruit characteristics, berry size (X_4), which appears highly significant in four daily analyses in 1951, does not appear significant on any day in 1952.[12/] Color (X_3) and Balling-acid ratio (X_5) each appear significant on a single day--Monday and Tuesday, respectively. The significance of fruit quality (X_2) in the early part of the week suggested by the 1951 daily analyses is not supported by the 1952 results. Fruit quality is not significant on any day in the latter year.

With regard to the direction of the relations which appear significant, the results in 1952, as in 1951, are in line with a priori expections. And, like 1951, the differences in the coefficients on different days of the week cannot be considered significant when the standard errors are taken into account.

Tokay Grapes, 1952.--Selected results of the Tokay seasonal analysis are summarized in Table 6. Only five variables appear significant in the seasonal results, and these variables remained uniformly significant in formulations which introduced the remaining variables into the analysis. Brand name (X_9) appears clearly to dominate the factors influencing percentage premiums in Tokays. Mode of shipment (X_8), which appeared rather consistently important in Thompsons, does not appear in the Tokays since the few lots of fruit shipped express were excluded from the analysis. Among the fruit characteristics, color (X_3) and berry size (X_4) are clearly significant. Other formulations introducing fruit

---

[12/] It is noted that relatively high intercorrelations between berry size and fruit quality on each day in 1952 serve to increase the standard errors of the coefficients of these variables, thus, reducing the statistical significance in each case.

TABLE 6

Regression Coefficients and Supplementary Measures,
Tokay Seasonal Equations, 1952[a]
(X_1 dependent)

n = 198

Equation	Constant term		Independent variables								
			X_2	X_3	X_4	X_9	X_{11}	X_{12}	X_{13}	R^2	$\bar{R}$
1	-1.733	β	0.093	0.154	0.117	0.584				.5335	.7238
		b	0.575	0.831	0.875	3.027					
		b'	2.88	4.16	4.38	15.14					
		t	1.36	2.91	2.11	9.91					
2	-2.429	β		0.169	0.148	0.636			0.101	.5391	.7277
		b		0.911	1.102	3.301			0.211		
		b'		4.56	5.51	16.50			1.06		
		t		3.39	2.94	12.43			2.05		
3	-2.404	β		0.185	0.161	0.66	-0.185		0.124	.5715	.7485
		b		0.994	1.206	3.427	-0.149		0.258		
		b'		4.97	6.03	17.14	-0.74		1.29		
		t		3.81	3.31	13.24	3.81		2.58		
4	-2.224	β		0.188	0.162	0.657	-0.187	-0.018	0.124	.5718	.7472
		b		1.013	1.209	3.408	-0.151	-0.073	0.260		
		b'		5.06	6.04	17.04	-0.76	-0.36	1.30		
		t		3.81	3.31	12.91	3.82	0.37	2.58		

[a] Variables identified in Exhibit 2, pp. 12-17. Approximate t-ratio at 5-per cent level of significance is 1.96.

quality (X_2), bunch description (X_7), and Balling-acid ratio (X_5) indicated that none of these variables were significantly related to price premiums in Tokays.

With regard to the variables introduced to reflect market conditions, it will be observed that per cent quality 2 (X_{11}) and day of week (X_{13}) are significant. The negative sign of the coefficient of X_{11} suggests that, for a given combination of other factors, the price premium decreases with an increase in the proportion of high quality fruit on the market. The positive sign of the coefficient of X_{13} suggests a systematic increase in the percentage premium, given a particular combination of the remaining characteristics, as the week progresses. It will be recalled that the systematic relation with day of week suggested by the 1952 Thompson analysis was in the opposite direction. Daily volume of sales (X_{10}) and daily average price (X_{12}) were also introduced into the Tokay analysis, but no support was found for a significant relation with these variables. As in the Thompson analyses, product terms involving X_{12} with X_3, X_4, and X_9 were introduced successively into our Tokay analysis but gave no statistically significant results.

Daily Tokay results are summarized in Table 7. The basic equations in the daily analyses contain those variables which proved significant in the seasonal analysis with two exceptions. Berry size (X_4) was excluded on Monday and color (X_3) on Friday. In each case, these variables have been excluded because virtually all of the observations with respect to these variables on the day involved have fallen in a single classification. This means that observations on these variables provided no information for analysis on the days indicated.

The most noteworthy result observed in the Tokay daily analyses is the uniformly dominant effect of brand name on price premiums throughout the week. As in other analyses where brand appears as a dominant variable, the interpretation of this relation is troublesome. It does not seem reasonable to suppose that brand preference is not somehow supported by favorable experience with fruit sold under the preferred label. If favorable experience is the explanation, it should be possible to discover and measure the factors which are responsible. With measurement of individual characteristics associated with preferred brands, more complete and certainly more useful results would be expected.

Our results in Table 7 suggest that color and berry size do not enter significantly into price premiums in the early part of the week. As has been indicated, the Monday data provide no information on berry size, and color is not significant on this day. On Tuesday neither variable is significant. On Wednesday color is significant while size is not. On Thursday both variables are

TABLE 7

Regression Coefficients and Supplementary Measures, Tokay Daily Equations, 1952[a] (X_1 dependent)

Equation	n	Constant term		Independent variables X_2	X_3	X_4	X_9	X_{11}	R^2	$\bar{R}$
				Monday						
1	30	1.479	β	0.313	0.091		0.341	-0.225	.2846	.4125
			b	1.375	0.365		1.337	-0.104		
			b'	6.88	1.82		6.68	-0.52		
			t	1.15	0.46		1.82	0.98		
				Tuesday						
2	49	-1.503	β	0.109	0.112	0.069	0.649	-0.145	.6014	.7450
			b	0.719	0.647	0.486	3.595	-0.109		
			b'	3.60	3.24	2.43	17.98	0.54		
			t	0.63	1.06	0.56	5.06	1.27		
				Wednesday						
3	45	-3.168	β	0.183	0.227	0.20	0.624	-0.032	.7721	.8619
			b	1.280	1.327	0.163	3.604	-0.060		
			b'	6.40	6.64	0.82	18.02	-0.30		
			t	1.56	2.69	0.23	5.90	0.39		

(Continued on next page.)

Table 7 continued.

Equation	n	Constant term		Independent variables X_2	X_3	X_4	X_9	X_{11}	R^2	$\bar{R}$
Thursday										
4	55	-2.911	β	0.189	0.178	0.226	0.606	-0.333	.6776	.8030
			b	1.348	0.947	1.906	3.234	-0.273		
			b'	6.74	4.74	9.53	16.17	-1.36		
			t	1.62	2.13	2.01	6.68	3.54		
Friday										
5	19	1.471	β	0.121		0.309	0.431	-0.321	.4729	.5677
			b	0.512		1.724	1.886	-0.276		
			b'	2.56		8.62	9.43	-1.38		
			t	0.28		1.22	0.93	1.38		

a/ Variables identified in Exhibit 2, pp. 12-17. Approximate t-ratios at 5-per cent level are: Monday, 2.06; Tuesday, Wednesday, and Thursday, 2.02; and Friday, 214.

significant. The Friday results are somewhat weaker than those for the other days. No information is provided on color on this day while the small number of observations and the relatively high intercorrelation between size and brand combine to increase the standard errors of the coefficients of the latter variables. Interpreting these results as they appear, the conclusion would seem to follow that color and berry size influence price premiums on the auction market only in the middle of the week. Although it is possible to visualize market situations into which these results would fit logically, more information is needed before it can be known what characterizes the market served by the New York auction.

Per cent quality 2, significant in the seasonal analysis of Tokays, appears significant only on Thursday in the daily analyses. There appears no strong a priori basis for expecting such a result.

Concluding Remarks

The results of the analyses summarized in this report suggest some of the factors related to auction price premiums. Among the specific fruit characteristics considered, berry size appears clearly to be related to price premiums in both Thompsons and Tokays. The statistical significance of the relations with such factors as color, stem condition, and Balling-acid ratio in selected formulations suggests that the possible effect of these characteristics on price premiums cannot be dismissed. The combination of fruit characteristics represented by our variable labeled fruit quality appears significant in Thompson Seedless premiums. This suggests a net effect attributable to this variable, but clear-cut interpretation is not possible due to the absence of a clear specification of the fruit characteristics involved.

The results with respect to other variables identifiable with individual lots are also suggestive. The importance of brand name in all three sets of data and of mode of shipment in Thompsons in both years is clearly evident. The significance of these variables suggests the existence of net effects on price premiums of brand name and mode of shipment as such. On the other hand, it is recognized that these net relations may reflect in part the effect of a combination of fruit characteristics typically associated with these two factors. If this is the case, a more complete specification of the associated fruit characteristics might well alter our results with respect to brand and mode of shipment.

Selected "market variables" and day of the week were introduced in an attempt to explore more fully the relations of fruit characteristics with price

premiums. Our results in selected formulations suggest that these variables or related measures merit attention in an analysis of this kind. The separate daily analyses summarized are considered purely exploratory in nature. More complete information about the characteristics of the market served by the New York auction would seem essential to a full appraisal of the daily results.

The analyses summarized bear only on the "explanation" of price premiums. Clearly, the premium associated with a given combination of fruit and pack characteristics represents only a part of the information which the grower or packer needs for his economic decisions. Cost considerations are equally important. The "production" of berry size, for example, involves costs. Direct costs associated with thinning and girdling are involved as well as real costs measurable in terms of yield sacrificed in the process of producing larger berries. In his decision, the grower must compare his "expected" net returns from a smaller volume of large berries with his "expected" returns from a larger volume of small berries. Similar considerations are clearly involved in connection with other fruit and pack characteristics where the "production" of premium characteristics involves additional costs to the grower or packer.

A rational economic decision with regard to the production and marketing of fresh grapes likewise cannot dismiss seasonality in price variation. Berry color, Balling-acid ratio, and, to some extent, size are related to maturity of berry at time of harvest. It follows that one way to alter these characteristics is to alter time of harvest. Yet, it is clear that the economic decision with respect to time of harvest must involve a joint consideration of the "expected" premiums associated with desirable qualitative characteristics and the "expected" price advantage associated with seasonal behavior of prices in the market.

The results which have been presented are viewed as suggesting some of the factors related to price premiums. The quantitative relations presented are recognized as being of limited direct applicability. Reference has been made to some of the reasons for this. Important among them is the absence of specification and analysis of the more important separate characteristics apparently reflected by the fruit quality, mode of shipment, and brand classifications. With respect to fruit quality, for example, it is not clear just how the grower or packer proceeds to alter the characteristics of the fruit or pack to conform to the preferred quality classification. Similarly, it would appear hazardous, without further study, to view the coefficients of mode of shipment and brand as measures of "net" effects of these variables.

A related point concerns the question of measurement of the qualitative factors. If quantitative measurements of fruit and pack characteristics reflecting the important qualitative factors could be developed, the quantitative estimates of relations with price premiums might prove more useful. Under this procedure, there would be no difficulty in identifying the characteristic observed. The measurement data also lend themselves readily to the analytical procedures employed in this study. Furthermore, the evaluation of costs of producing premium fruit might be made somewhat more precise were measurable characteristics involved. On the other hand, without further study, it is by no means clear that quantitative measurements of such factors as color and stem condition can be developed which will serve well for analyzing the relations of these factors to price premiums.

It is clear, of course, that relations derived from a study of the New York auction may not apply to fruit sold in other auction markets or to fruit not marketed through auction channels. The prevailing opinion in the industry appears to be that the New York auction is a "quality conscious" market. Although our results would not suggest a high degree of quality consciousness in this market, the possibility remains that the relations with qualitative factors might be somewhat different in other markets.